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THESIS

**WHO BECOMES A LIMITED DUTY OFFICER AND
CHIEF WARRANT OFFICER? AN EXAMINATION OF
DIFFERENCES OF LIMITED DUTY OFFICERS AND
CHIEF WARRANT OFFICERS IN THE NAVY.**

by

Walter F. Manuel

June 2006

Thesis Co-Advisors:

Armando Estrada
Cary Simon

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This thesis examines the Navy Limited Duty Officer and Chief Warrant Officer programs to determine the differences in characteristics. Descriptive statistics, correlation analysis was developed for year groups 1990 through 2005 to analyze the differences in background characteristics and military characteristics of both programs. The study used a logistic regression analysis to examine the predictors of background and military characteristics of Limited Duty Officers and Chief Warrant Officers. The results of the study revealed the background characteristics age, education, race and ethnicity groups were significantly different between the Limited Duty Officer and Chief Warrant Officer Communities. The military characteristics rank, length of service and Armed Forces Qualification Test were significant among Limited Duty Officers and Chief Warrant Officers. This study explains the results and provides recommendations to the Bureau of Naval Personnel and future research.

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Walter F. Manuel
Lieutenant, United States Navy
B.S., Southern Illinois University, 1998

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June 2006

Author: Walter F. Manuel

Approved by: Dr. Armando Estrada
Co-Advisor

Dr. Cary Simon
Co-Advisor

Robert Beck, Dean
Graduate School of Business and Public Policy

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ABSTRACT

This thesis examines the Navy Limited Duty Officer and Chief Warrant Officer programs to determine the differences in characteristics. Descriptive statistics, correlation analysis was developed for year groups 1990 through 2005 to analyze the differences in background characteristics and military characteristics of both programs. The study used a logistic regression analysis to examine the predictors of background and military characteristics of Limited Duty Officers and Chief Warrant Officers. The results of the study revealed the background characteristics age, education, race and ethnicity groups were significantly different between the Limited Duty Officer and Chief Warrant Officer Communities. The military characteristics rank, length of service and Armed Forces Qualification Test were significant among Limited Duty Officers and Chief Warrant Officers. This study explains the results and provides recommendations to the Bureau of Naval Personnel and future research.

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I. INTRODUCTION

A. BACKGROUND

For many years the Limited Duty Officer (LDO) and Chief Warrant Officer (CWO) programs have been one of the Navy's oldest commissioning sources for enlisted personnel. Limited Duty Officers are technical managers and Chief Warrant Officers are technical specialists of the line and staff corps. Although both programs are separate, they are interchangeable up to the rank of Lieutenant Commander. Both communities have personnel serving in key leadership positions and the programs provide numerous opportunities for top performing senior enlisted sailors to apply for commission. The Limited Duty and Chief Warrant Officer communities comprise 11 percent of the officer corps (Bureau of Naval Personnel Manual, 1982). Both communities promote within broad technical fields that relate to former enlisted ratings. LDOs/CWOs serve as Division Officers, Department Heads, Officers-in-Charge, Executive Officers and Commanding Officers (Bureau of Naval Personnel Manual, 1982). While there is generally accepted agreement that the LDO and CWO programs have been successful, the extent to which these programs can adapt to the needs and expectations of future naval challenges remains unclear.

The Continental Congress created the Warrant Officer grades on 13 December 1775 (Bureau of Naval Personnel Instruction, 1994). From the beginning of World War I to World War II, Warrant Officer ranks were dramatically increased and 12 new specialties were created (Bureau of Naval Personnel Instruction, 1994). However, Warrant Officers were not deemed competitive for promotion with other commissioned officers. In 1948, the Limited Duty Officer program was created to provide a competitive position for officers promoted from the ranks while retaining the necessary knowledge, skills and abilities learned as enlisted men or Warrant Officers. The Limited Duty Officer was established under the Officer Personnel Act of 1947 (Bureau of Naval Personnel Instruction). The LDO community was created as a relatively small, elite group of officers that retained their specialties acquired as enlisted men and Warrant Officers. LDO's support the Unrestricted Line Officer community during periods of

personnel shortages or when technical advances are required (Bureau of Naval Personnel Manual, 1982). However, they do not directly compete with Unrestricted Line Officers.

In 1949, the Defense Reorganization Act of 1949 created four new Warrant Officer grade levels: W1, CWO2, CWO3 and CWO4. In 1959, the Williams Board conducted a study of Warrant Officers and Limited Duty Officers in relation to the new established E-8 and E-9 pay grades. The Warrant Officer program was phased out and the Limited Duty Officer program expanded due to shortages in junior officers (Bureau of Naval Personnel Instruction, 1994).

By 1963, the Navy's need for officer technical specialists increased and the phase out of the Warrant Officers created a deficiency not filled by the Limited Duty Officers and senior enlisted E-8 and E-9. The Settle Board was convened and the Warrant Officer ranks were reactivated (Bureau of Naval Personnel Instruction, 1994).

In 1974, the Secretary of the Navy approved a plan to improve the Limited Duty and Chief Warrant Officer communities by defining the functional roles and billet structure of each community (Reilly, 1999). The procurement provided separate career paths for LDO'S and CWO'S. Additionally, the plan provided opportunities for younger LDOs capable of promoting to Commander 0-5. By 1985, Congress authorized LDO promotion to Captain (Drewry, 1998). The Chief Warrant Officer ranks were expanded to CWO5 in 2004.

From 2005, enlisted personnel from E-6 through E-8 became eligible Limited Duty Officer candidates. Minimum time-in-service is eight years and maximum time is 16 years. The majority of the LDO community is from the Chief Petty Officer ranks. First Class Petty Officers (E-6) make up approximately five percent of the LDO community (Bureau of Naval Personnel Manual, 1982). Chief Warrant Officer eligible candidates are E-7 through E-9. The minimum time-in-service is 14 years and the maximum time is 24 years (Chief of Naval Operations Instruction 1420.1, 2003).

B. PURPOSE

The purpose of this research is to examine the Navy Limited Duty and Chief Warrant Officer programs to determine the differences in characteristics. Characteristics

are defined here as background and military traits. Additionally, the study includes a logistic regression analysis to assess the characteristics that are significantly different between Limited Duty Officers and Chief Warrant Officers.

C. SCOPE AND METHODOLOGY

1. Research Questions

The research questions analyzed in this study are as follows:

- Are there differences in the characteristics of individuals that become LDO(s) versus CWO(s), i.e., age; ethnicity; and time in service?
- What are the individual differences in the background characteristics of Limited Duty Officers and Chief Warrant Officers?
- What are the military characteristic differences of the Navy Limited Duty Officers and Chief Warrant Officers?
- What are the best predictors of future success or promotion for Limited Duty Officer and Chief Warrant Officer Communities?

D. SCOPE

The scope of this thesis includes: (1) an examination of the current composition of officers in Limited Duty and Chief Warrant Officer communities, (2) a comparison of characteristics of officers commissioned in the Limited Duty and Chief Warrant Officer programs, (3) an examination of the predictors of background and military characteristics of Limited Duty and Chief Warrant Officers.

E. METHODOLOGY

Literature and document data for this study were obtained primarily from the Center of Naval Analysis focusing on facts, trends of background and military characteristics of Limited Duty and Chief Warrant Officers. The data were taken from Limited Duty and Chief Warrant Officers files from year group 1995 through 2005. A descriptive statistical analysis was used to show the differences in background and military characteristics of both programs. A logistic regression analysis was used to show predictors of background and military characteristics of Limited Duty and Chief Warrant Officers. The dependent measure was the service community which is defined by either LDO or CWO. The independent variables and combination of variables included: age, gender, race, education, marital status, rank, time-in-service, warfare community, occupation and specialty.

F. BENEFITS OF THIS STUDY

The results of this study spotlight facts and trends in the characteristics of the Limited Duty Officer and Chief Warrant Officer programs. The premise is that Naval Limited Duty and Chief Warrant Officers make a substantial contribution to the overall effectiveness of Naval organizations. Naval planners, detailers, recruiters and decision makers can use the conclusions and recommendations to improve these important and relevant programs. Further, the study provides guidance to potential applicants of the composition and value of the Limited Duty Officer and Chief Warrant Officer communities.

This study is organized into five chapters. Chapter II reviews applicable literature that is relevant to this study. The chapter describes the U.S. Navy's Limited Duty Officer and Chief Warrant Officer program and LDO and CWO utilization in the Armed Forces. Additionally, the chapter describes a more in depth look at who becomes a LDO or CWO. Chapter III is a detailed analysis of the contents, of the data set, that was used for the research and a description of how the study was conducted. Chapter IV describes and discusses the results obtained from the trend analysis and logistic regression. Chapter V summarizes the conclusions of the study, answers the research questions and provides

policy recommendations based on the research. Additionally, this chapter will recommend future research suggestions based on the study.

G. ORGANIZATION OF STUDY

This study is organized into five chapters. Chapter II reviews literature relevant to this study. The chapter describes the U.S. Navy's Limited Duty and Chief Warrant Officer programs and LDO and CWO utilization in the Armed Forces. Additionally, the chapter describes an in depth look at who becomes a LDO or CWO. Chapter III is a detailed analysis of the contents and the data set that was used for the research, including a description of how the study was conducted. Chapter IV describes and discusses the results obtained from the descriptive statistical analysis and logistic regression. Chapter V summarizes the conclusions of the study, answers the research questions and provides policy recommendations based on the research. Additionally, this chapter recommends future research suggestions to follow-on from this study.

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II. LITERATURE REVIEW

A. OVERVIEW

The traditional roles of Limited Duty Officers and Chief Warrant Officers have changed over the past 50 years. This chapter provides a review of program documentation related to the Limited Duty Officer program and Chief Warrant Officer program. This chapter is divided into five sections. The first section reviews the background and mission statement of the Limited Duty Officer and Chief Warrant Officer program. The second section looks at the Limited Duty Officer program. The third section looks at the Chief Warrant Officer program. The fourth section reviews Limited Duty Officer and Chief Warrant Officer utilization in the Armed Forces. The fifth section analyzes the pathways to becoming a Limited Duty Officer and Chief Warrant Officer.

B. LIMITED DUTY OFFICER AND CHIEF WARRANT OFFICER PROGRAM

1. Background

Both Limited Duty Officers and Chief Warrant Officers provide a path for senior enlisted personnel to compete for a commission (Bureau of Naval Personnel Manual 15627, 1994). The LDO and CWO programs are the only commissioning sources that do not require a baccalaureate degree. However, applicants are encouraged to have a degree to be more competitive. These two programs have generally long career progression timelines, with many of them exceeding 30 years of service. Limited Duty Officers make up 8 % of the active duty officer inventory and Chief Warrant Officers make up 3 % (Fiegl, 2003).

Limited Duty Officer and Chief Warrant Officers attend a 5 week Officer Indoctrination training in Pensacola, Florida after receiving their commission. According to the LDO/CWO school, the graduate by designator for fiscal year 2002 through 2004 (LDO/CWO School, 2004). Table 1 show that the majority of the LDO and CWO community is in the surface community.

Table 1. LDO and CWO Community Percentages

COMMUNITY	PERCENTAGE
Surface	36%
Aviation	22%
Submarine	15%
General	24%
Staff	5%

2. Mission Statement

We are technical managers, experts and leaders who serve our Navy in any capacity as directed. We pride ourselves and being every Sailors leader and every leaders Sailor. Our values are the defining aspect of our character. No quote marks – hence the indent

- Honor, Courage, Commitment.
- Integrity, Dedication, Loyalty, and Honesty of Mind.
- Steadfast Leadership with Humility.
- Diversity and World-Wide Assignable.
- Mentorship and Sailors.

(LeFever, 1994, p. 1)

C. LIMITED DUTY OFFICER PROGRAM

“Limited Duty Officers are technically oriented officers who perform duties limited to specific occupational fields and require strong managerial skills” (Office of Chief of Naval Operations Instruction 1420.1A, 2003, p. 1). These officers are technical managers of the Line and Staff Corps and fill leadership positions from Ensign through Captain. LDO’s fill billets that are not in the normal career path of Unrestricted Line Officers. They can serve as Division Officers, Department Heads, Officer-in-Charge, Executive Officers and Commanding Officers afloat or ashore (Bureau of Naval Personnel Instruction 1430.16E, 2001). However, LDO’s do not typically serve as Commanding Officers afloat.

The Limited Duty Officer program is open to senior enlisted personnel E-6 (First Class Petty Officer) through E-9 (Master Chief Petty Officer). E-6 personnel must be eligible to promote to E-7 (Chief Petty Officer) in order to apply for the program. The LDO program is also open to Chief Warrant Officers with at least 3 years of commission service. All applicants must have a minimum of 8 years of service but no more than 16 years of service. Additionally, all applicants must have a recommendation endorsement from their Commanding Officer to apply (Office of Chief of Naval Operations Instruction 1420.1A, 2003).

Limited Duty Officer program is a unique commissioning source. LDO's are commissioned as temporary officers under Title X U.S.C. Section 5596 (Secretary of the Navy Instruction 1412.8, 1982). LDO's remain temporary officers until they are promoted to the rank of Lieutenant. After they are promoted to Lieutenant, they are offered a permanent commission under Title X U.S.C. Section 5589 (Secretary of the Navy Instruction 1120.3D, 2003). If a LDO declines a permanent commission they are reverted back to their enlisted rank in accordance with the Enlisted Advancement Manual (Bureau of Naval Personnel Instruction 1430.16E, 2001). Limited Duty Officers must serve 10 years of commission service to retire as an officer.

Limited Duty Officers have 29 designators that are grouped into two separate categories such as LDO Line and LDO Staff. Most enlisted ratings have a direct path to LDO designators, however, 7 percent of the enlisted ratings do not have a direct path to LDO designators (Fernandez, 2002). Limited Duty Officer designators first digit start with a 6 (Bureau of Naval Personnel Instruction 15627, 1994).

Table 2. Limited Duty Officer Designators

DESIGNATOR	TITLE
611X	Deck-Surface
612X	Operations-Surface
613X	Engineering/Repair-Surface
615X	Special Warfare
616X	Ordnance-Surface
618X	Electronics-Surface
621X	Deck-Submarine
623X	Engineering/Repair-Submarine
626X	Ordnance-Submarine
628X	Electronics-Submarine
629X	Communications-Submarine
631X	Aviation Deck
632X	Aviation Operations
633X	Aviation Maintenance
636X	Aviation Ordnance
639X	Air Traffic Control
640X	Nuclear Power
641X	Administration
642X	Information Systems
643X	Bandmaster
644X	Cryptology
645X	Intelligence
646X	Meteorology/Oceanography
647X	Photography
648X	Explosive Ordnance Disposal
649X	Security
651X	Supply
653X	Civil Engineer Corps
655X	Law

D. CHIEF WARRANT OFFICER PROGRAM

The Chief Warrant Officer Program is one of the oldest commissioning sources. Chief Warrant Officers are technical specialists who perform duties requiring strong technical competence in specific occupational fields (Bureau of Naval Personnel Manual 15627, 1994). These occupational fields directly relate to enlisted occupational fields. They have the authority and responsibility greater than a Master Chief Petty Officer (Bureau of Naval Personnel Manual 15627, 1994).

In addition to being a technical specialist, Chief Warrant Officers also serve as Division Officers, Department Heads, Officer-in-Charge, Executive Officer, Commanding Officer, ashore or afloat (Bureau of Naval Personnel Manual 15627, 1994). However, Executive Officer and Commanding Officer is not the normal career path for a Chief Warrant Officer.

The Chief Warrant Officer program is open to all E-7 Chief Petty Officers through E-9 Master Chief Petty Officers. All applicants must have completed a minimum of 12 years but, no more than 24 years of active service (Chief of Naval Operations Instruction 1420.1A, 2003). All personnel selected for CWO will be appointed permanent commission as CWO2 under Title X U.S.C Section 571. The exception to this is Master Chief Petty Officers. Master Chief Petty Officers who have completed at least 2 years time-in-rate if selected will be appointed to CWO3.

Chief Warrant Officers must serve a minimum of 3 years of commission service (Secretary of the Navy Instruction 1412.8, 1982). In order to retire as an officer, many senior enlisted personnel will apply for CWO before LDO because of the shorter commitment of commission service.

Many studies and research have been conducted to suggest utilizing the Chief Warrant Officer program more efficiently (Fernandez, 2002). Chief Warrant Officers have seen more changes in the Navy in the past few years than Limited Duty Officers. One of the changes in the CWO community is promotion. Chief Warrant Officers were only able to promote to the highest rank of CWO4 until 2003. In 2003, Chief Warrant Officers were authorized to promote to the rank of CWO5 (Secretary of the Navy Instruction 1412.8, 1982). The most recent change to the Chief Warrant Officer program was to fly as aviators and flight officers. The new program will make these CWO's professional flyers. They will fly P-3 Orion Fixed-Wing aircraft or H-60. This new program will also change the rank and age of new appointed Chief Warrant Officers. The new flying program will be open to E-5 thru E-7 who is under 27years of age. The applicants must have an Associates Degree or higher and pass a flight physical (Navy Administrative Message, 2006).

Chief Warrant Officers have 29 designators. CWO designators first digit starts with a 7. Chief Warrant Officer designators provide a direct path for enlisted rating specialty fields. Approximately 10% of enlisted rating specialty fields do not have a direct path to CWO designators (Fernandez, 2002).

Table 3. Chief Warrant Officer Designators

DESIGNATOR	TITLE
711X	Boatswain-Surface
712X	Operations Technician-Surface
713X	Engineering Technician-Surface
714X	Repair Technician-Surface
715X	Special Warfare Technician
716X	Ordnance Technician-Surface
717X	Special Warfare Combatant Craft-Crewman
718X	Electronics Technician-Surface
720X	Diving Officer
721X	Boatswain-Submarine
723X	Engineering Technician-Submarine
724X	Repair Technician-Submarine
726X	Ordnance Technician-Submarine
728X	Electronics Technician-Submarine
731X	Aviation Boatswain
732X	Aviation Operations Technician
734X	Aviation Maintenance Technician
736X	Aviation Ordnance Technician
738X	Aviation Electronics Technician
740X	Nuclear Power Technician
741X	Ship's Clerk
742X	Information Systems Technician
744X	Cryptologic Technician
745X	Intelligence Technician
748X	Explosive Ordnance Disposal Technician
749X	Security Technician
751X	Supply Corps
752X	Food Service
753X	Civil Engineer

E. ARMED FORCES CHIEF WARRANT OFFICER AND LIMITED DUTY OFFICER PROGRAMS

Warrant Officers and Limited Duty Officers are not utilized in some of the other Armed Forces. Warrant Officers are used in the Army, Marine Corps and Coast Guard. Limited Duty Officers are utilized in the Marine Corps but, neither the Army nor the Coast Guard has Limited Duty Officers. The Air Force is the only Armed Forces that do not have Warrant Officers or Limited Duty Officers. The Air Force stopped appointing Warrant Officers in 1959 after Congress authorized the creation of senior enlisted ranks (Wikipedia, 2006).

1. Army Warrant Officer Program

“Army Warrant Officers are highly specialized experts and trainers who, by gaining progressive levels of expertise and leadership, operates, maintains, administers, and manages the Army’s equipment, support activities, or technical systems for an entire career (Department of the Army, 1996).” The Army’s Warrant Officer program is split between Aviation helicopter pilots and technical billets. The requirement for Warrant Officers is the same with the exception of aviation. Applicants can apply for Warrant Officer Aviation without prior enlisted service. The Warrant Officer technical billets require potential candidates to be at least in pay grade E5 or higher with 4 to 6 years experience in a skill that is associated with a Warrant Officer MOS (Warrant Officers Heritage Foundation, 2005).

2. Marine Corps Warrant Officer and Limited Duty Officer Program

The Marine Corps Warrant Officer program provides both technical and non-technical officer specialist that require extensive knowledge, training and experience with systems or equipment that are beyond the duties of unrestricted officers (Fernandez, 2002).

The eligibility requirements for the technical Warrant Officer program is a minimum pay grade of E5 and have no less than 8 years or more than 16 years of active naval service. The non-technical Warrant Officers program is a minimum pay grade of E7 and minimum time in service of 16 or no more than 23 years of active service (Secretary of the Navy Instruction 1120.11A, 1991). Marine Corps Warrant Officers are a mid-career selection of officers (Fernandez, 2002).

The Marine Corps Limited Duty Officers are technical specialists who perform duties that are limited to specific military occupational specialist (MOS) which are beyond the duties of a Warrant Officer and senior Unrestricted Officer (Fernandez, 2002). The Marine Corps Limited Duty Officer program is unique in that applicant must be serving as a permanent Warrant Officer with a minimum time of 8 years and maximum of 20 years of active service (Estes, 1996). Marine Corps Limited Duty Officers is a Late career selection of officers.

3. Coast Guard Chief Warrant Officer Program

Coast Guard Officers are technical specialist whose skills, knowledge and expertise are required in many assignments. Chief Warrant Officers must have strong leadership skills. The Coast Guard Chief Warrant Officers are similar to the Navy's Chief Warrant Officer program. However, Coast Guard Chief Warrant Officers fill many small command billets. Coast Guard Chief Warrant Officers are a mid-career selection of officers (Military Professional Development Center, 2006).

Applicants for the Chief Warrant Officer program must be serving in pay grade E-6 and above. Pay grade E-6 personnel must be in the top 50 percent on the E-7 eligibility list for advancement.

F. BECOMING A LIMITED DUTY OFFICER OR CHIEF WARRANT OFFICER IN THE NAVY

Becoming a Navy Limited Duty Officer or Chief Warrant Officer is challenging and competitive process. The selection convenes once a year in January. For applicants to be competitive superior performance in assignments is the key. Successful applicants usually have a variety of assignments such as ships, squadrons and shore assignments. A college degree is not required, however, to be competitive in selection as degree is encouraged.

There have been many debates if the Navy's Limited Duty Officer and Chief Warrant Officer program selects the best enlisted personnel. One of the arguments that the Navy Limited Duty Officers and Chief Warrant Officers are superb enlisted personnel is the fact that most enlisted personnel that apply are not selected. According to

Fernandez, in 1998 and 1999, the majority of successful applicants were in pay grade E-7 (2002). Personnel selected for Limited Duty Officer had completed 14 years of enlisted service. The average age of LDO's selected in 1998 was between 28-33 years old (Burlage, 1998).

In 1998, 2737 applicants applied for LDO and only 256 were selected. This is a selection rate of 9.3% (Burlage, 1998). The Chief Warrant Officer program had 1006 applicants apply in 1998 and 197 were selected. This was a selection rate of 19.5%. The average age of CWO's selected in 1998 was between 33-35 years old (Burlage, 1998). In that year the selection board for Chief Petty Officer was 12.3% and the Enlisted commissioning program was 44% (Burlage, 1998). The Limited Duty Officer program had the lowest selection rate of any enlisted commissioning program or selection to the senior enlisted rank of Chief Petty Officer.

G. CHAPTER SUMMARY

The literature provides a review and analysis from research literature of the Navy Limited Duty Officer and Chief Warrant Officer program. This chapter also reviews the Limited Duty Officer and Chief Warrant Officer program in the other Armed Forces. This thesis examines the LDO and CWO programs to determine the differences in the characteristics.

This study will answer the primary question are there differences in the characteristics of individuals that become LDO's versus CWO's. Additionally, what are the differences in background and military characteristics. The next chapter describes the approach used to compare the differences in Limited Duty Officers versus Chief Warrant Officers.

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III. RESEARCH METHODOLOGY

A. INTRODUCTION

This chapter discusses the data that was collected to determine the different characteristics between Limited Duty Officers and Chief Warrant Officers. It describes data sources, sample characteristics and defines each of the variables included in the study. The chapter concludes with a review of the methodology used in specifying the research model.

B. DATA DESCRIPTION

1. Description of the Officer Sample

Data on both Limited Duty Officer and Chief Warrant Officer were obtained from the Center for Naval Analysis (CNA), a non-profit federally funded research and development center with headquarters located in Alexandria, Virginia. The data were drawn from the Longitudinal Officer File which contains records for Naval officers from time of commission until separation from the Department of the Navy. The records include data from Limited Duty Officers and Chief Warrant Officers in year groups 1990 through 2004.

Fifty-eight variables were included in the data, representing a sample size of 9,972 cases. The data includes 3 types of variables that provide information on warfare community, background and military characteristics for each of the cases. Variables contained in the data set include gender, age, ethnicity, marital status, family status education, rank length-of-service, total sea time, warfare community, armed forces qualification test (AFQT). Figure 1 displays the three major categories of variables used in the study for Limited Duty Officers and Chief Warrant Officers.

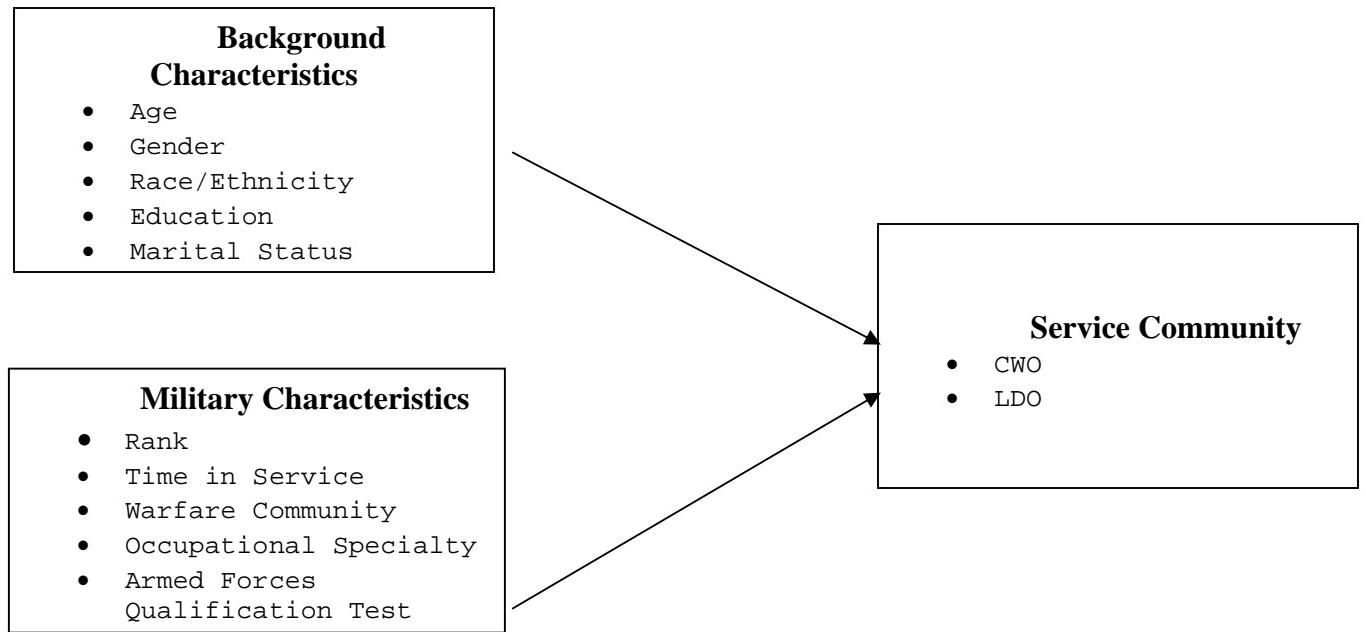


Figure 1. Variables

a. Description of the Limited Duty Officer Community

The Limited Duty Officer data set consists of 58 variables with a total sample size of 5,773. The data has been divided into 3 categories of variables such as: community, background characteristics and military characteristics. The categories consist of 12 major groups community, gender age, ethnicity, marital status, family status education, rank length-of-service, total sea time, warfare community, armed forces qualification test (AFQT). Figure 1 displays the three major categories of variables used in the study for Limited Duty Officers.

b. Description of Chief Warrant Officer Community

The Chief Warrant Officer Community data set consists of 58 variables and a sample size of 4,197. The data has been divided into 3 categories of variables such as: community, background characteristics and military characteristics. The categories consist of 12 major groups community, gender age, ethnicity, marital status, family status education, rank length-of-service, total sea time, warfare community, armed forces

qualification test (AFQT). Figure 1 displays the three major categories of variables used in the study for Limited Duty Officers. The groups of variables will be examined in the next chapter data analysis.

C. DEFINITION OF TERMS

This section provides definition of terms and variables included in the study. This section describes the Warfare Communities: Surface, Aviation, Submarine, General, and Staff; as well as the different Limited Duty Officer and Chief Warrant Officer Occupational Specialty areas and designators.

1. Limited Duty Officer Community

“Limited Duty Officers are technically oriented officers who perform duties limited to specific occupational fields and require strong managerial skills” (Office of Chief of Naval Operations Instruction 1420.1A, 2003). These officers are technical managers of the Line and Staff Corps and fill leadership positions from Ensign through Captain. LDO’s fill billets that are not in the normal career path of Unrestricted Line Officers. They can serve as Division Officers, Department Heads, Officer-in-Charge, Executive Officers and Commanding Officers afloat or ashore (Bureau of Naval Personnel Instruction 1430.16E, 2001). However, LDO’s do not typically serve as Commanding Officers afloat.

2. Chief Warrant Officer Community

The Chief Warrant Officer program occupational fields directly relate to enlisted occupational fields. They have the authority and responsibility greater than a Master Chief Petty Officer (Bureau of Naval Personnel Manual 15627, 1994).

Chief Warrant Officers are technical specialists that may also serve as Division Officers, Department Heads, Officer-in-Charge, Executive Officer, Commanding Officer, ashore or afloat (Bureau of Naval Personnel Manual, 1994). However, Executive Officer and Commanding Officer is not the normal career path for a Chief Warrant Officer.

D. WARFARE COMMUNITY

1. Surface Warfare

Surface Warfare Officers are leaders onboard Navy ships. They manage professional and highly training sailors to maintain and operate ship's systems.

2. Aviation Warfare

Aviation Officers are leaders in the Aviation Community. They are Pilots, Naval Flight Officers and Aviation Maintenance Duty Officers that operate and maintain aircraft.

3. Submarine Warfare

Submarine Officers are leaders onboard Navy Submarines. They manage professional and highly training sailors to maintain and operate submarine systems and nuclear reactors.

4. General

General Officers are leaders in operations, maintenance, training, or support of all other elements of naval warfare.

5. Staff Corps

Staff Corps are specialists in career fields which are professions unto themselves, such as physicians, lawyers, civil engineers, etc.

E. OCCUPATIONAL SPECIALTY AREAS

1. Description of Limited Duty Officer and Chief Warrant Officer Designator

Officer designators consist of four digits. Each digit indicates the officer's status in the Navy. The first digit of an officer designator indicates the officer category. Limited Duty Officers and Chief Warrant Officers are identified by a 6 for Limited Duty Officers and 7 for Chief Warrant Officers for the first digit (example 61XX and 71XX) (Bureau of Naval Personnel Manual, 1994).

The second digit indicates the general category or warfare community within the Limited Duty Officer and Chief Warrant Officer Community. Table 4 is an example of the second digit and category (Bureau of Naval personnel Manual, 1994).

Table 4. Description of Warfare Community Category Digit

SECOND DIGIT	CATEGORY
1	Surface
2	Submarine
3	Aviation
4	General
5	Staff

The third digit indicates the Limited Duty Officer and Chief Warrant Officer technical specialty. The fourth digit indicates the officer's status in the Navy or Naval Reserve. Table 5, is a description of the fourth digit (Bureau of Naval Personnel Manual 15627, 1994).

Table 5. Description of Officer Category Digit

FOURTH DIGIT	STATUS
0	An officer of the regular Navy whose permanent grade is ensign or above.
1	An officer of the regular Navy whose permanent status is Warrant Officer
2	A temporary officer of the regular Navy whose permanent status is enlisted.
3	An officer of the regular Navy who is on the retired list.
4	A restricted line or Staff Corps Officer of the regular Navy who is Material Professional (MP) designated.
5	An officer of the Naval Reserve.
6	A restricted line or Staff Corps Officer of the Naval Reserve who is MP designated.
7	An officer of the Naval Reserve on active duty in the TAR program (Training and Administration of Reserves).
8	An officer of the Naval Reserve who was appointed in the Naval Reserve Integration Program from enlisted status, or whose permanent status is Warrant Officer or enlisted.
9	An officer of the Naval Reserve who is on the retired list.

2. Description of Limited Duty Officer Occupational Specialty

Table 6 identifies each of the designators and provides a definition for the Limited Duty Officer designators and a brief occupational specialty description (Bureau of Naval Personnel Manual 15627, 1994).

Table 6. Description of Limited Duty Officer Occupational Specialty

WARFARE COMMUNITY	DESIGNATOR	TITLE
Surface Warfare	611X	Deck-Surface – are technical managers in the field of seamanship and navigation with naval experience in these areas.
	612X	Operations-Surface – are technical managers in the operation, employment and application of techniques, equipment, systems and procedures related to surface operations.
	613X	Engineering/Repair-Surface – are technical managers in the field of surface ship marine engineering, including maintenance and repair of main propulsion, electrical and auxiliary machinery systems.
	615X	Special Warfare – are technical managers in the SEAL Community.
	616X	Ordnance-Surface – are technical managers with practical experience in ordnance operations.
	618X	Electronics-Surface – are technical managers in the field of non-nuclear electronics.
Submarine	621X	Deck-Submarine – are technical managers in the field of seamanship and navigation with naval experience in these areas.
	623X	Engineering/Repair-Submarine – are technical managers in the field of ship marine engineering, including operation, maintenance and repair of main

		propulsion and auxiliary machinery and systems.
	626X	Ordnance-Submarine – are technical managers in the strategic weapons and ordnance field.
	628X	Electronics-Submarine – are technical managers in the field of non-nuclear electronics.
	629X	Communications-Submarine – are technical managers in the operation, employment, and application of techniques, equipment, systems and procedures in submarine communication.
Aviation	631X	Aviation Deck – are technical managers in aircraft handling and support operations aboard ship.
	632X	Aviation Operations – are technical managers in air antisubmarine warfare.
	633X	Aviation Maintenance – are technical managers in the field of aviation maintenance.
	636X	Aviation Ordnance – are technical managers in the field of operations and maintenance of aviation ordnance and aircraft armament.
	639X	Air Traffic Control – are technical managers in the field of air traffic control.
General	640X	Nuclear Power – are technical managers in the repair, maintenance, and operation of naval nuclear propulsion plants, nuclear ship's system and associated equipments.
	641X	Administration – are technical managers who perform duties in the field of administration, personnel, manpower planning and requirement determination studies, organization planning, postal functions, and printing.
	642X	Information Systems – are technical managers in the field of automated data processing using

		electronic digital and analog computer systems.
	643X	Bandmaster – are officer technical managers in the field of music and in administering the Navy music program.
	644X	Cryptology – are technical managers in all phases of operations conducted by the Naval Security Group Command.
	645X	Intelligence – are technical managers in the field of intelligence.
	646X	Meteorology/Oceanography – technical managers that provide meteorological and oceanographic support for fleet operations.
	647X	Photography – are technical managers responsible for photographic systems.
	648X	Explosive Ordnance Disposal – are technical managers in the field of detection, identification, field evaluation, rendering safe recovery and disposal of ordnance, explosives and demolition materials.
	649X	Security – are technical managers in field of law enforcement and physical security.
Staff	651X	Supply – are technical managers in the field of supply, food service and operation of Bachelor Officer and Enlisted quarters.
	653X	Civil Engineer Corps – are technical managers in the fields of construction, facilities maintenance, utilities and automotive equipment.
	655X	Law – are technical managers specializing in administration of legal services.

3. Description of Chief Warrant Officer Occupational Specialty

Table 7 lists the Chief Warrant Officer designators and a brief occupational description (Bureau of Naval Personnel Manual 15627, 1994).

Table 7. Description of Chief Warrant Officer Occupational Specialty

WARFARE COMMUNITY	DESIGNATOR	
Surface Warfare	711X	Boatswain-Surface - are technical specialists in the field of seamanship and navigation with naval experience in these areas
	712X	Operations Technician-Surface - are technical specialists in the operation, employment and application of techniques, equipment, systems and procedures related to surface operations.
	713X	Engineering Technician-Surface - are technical specialists in the field of surface ship marine engineering, including maintenance and repair of main propulsion, electrical and auxiliary machinery systems.
	714X	Repair Technician-Surface – are technical specialists in ship repair and maintenance, damage control, and firefighting procedures, techniques and equipment.
	715X	Special Warfare Technician - are technical specialists in the SEAL Community.
	716X	Ordnance Technician-Surface - are technical specialists with practical experience in ordnance operations.
	717X	Special Warfare Combatant Craft-Crewman – are technical specialist in the field of special warfare combatant craft crewman.
	718X	Electronics Technician-Surface - are technical specialists in the field of non-nuclear electronics.
Submarine	720X	Diving Officer – are technical specialist in the fields of underwater ship's husbandry, ship salvage and undersea research.
	721X	Boatswain-Submarine - are technical specialists in the field of seamanship and navigation with naval experience in these areas.
	723X	Engineering Technician-

		Submarine - – are technical specialists in the field of ship marine engineering, including operation, maintenance and repair of main propulsion and auxiliary machinery and systems.
	724X	Repair Technician-Submarine – are technical specialist in the field of maintenance, repair and inspection of submarine hull, structure.
	726X	Ordnance Technician-Submarine - are technical specialists in the strategic weapons and ordnance field.
	728X	Electronics Technician-Submarine - are technical specialists in the field of non-nuclear electronics.
Aviation	731X	Aviation Boatswain - are technical specialists in aircraft handling and support operations aboard ship.
	732X	Aviation Operations Technician - are technical specialists in air antisubmarine warfare.
	734X	Aviation Maintenance Technician – are technical specialists in the field of aircraft maintenance.
	736X	Aviation Ordnance Technician - are technical specialists in the field of operations and maintenance of aviation ordnance and aircraft armament.
	738X	Aviation Electronics Technician – are technical specialists in the field of avionics.
General	740X	Nuclear Power Technician - are technical specialists in the repair, maintenance, and operation of naval nuclear propulsion plants, nuclear ship's system and associated equipments.
	741X	Ship's Clerk - are technical specialists who perform duties in the field of administration, personnel, manpower planning and requirement determination studies, organization planning, postal functions, and printing.
	742X	Information Systems Technician - are technical specialists in the field of automated data processing using electronic digital and analog computer

		systems.
	744X	Cryptologic Technician - are technical specialists in all phases of operations conducted by the Naval Security Group Command.
	745X	Intelligence Technician - are technical managers in the field of intelligence.
	748X	Explosive Ordnance Disposal Technician - are technical specialists in the field of detection, identification, field evaluation, rendering safe recovery and disposal of ordnance, explosives and demolition materials.
	749X	Security Technician - are technical specialists in field of law enforcement and physical security.
Staff	751X	Supply Corps - are technical specialists in the field of supply, food service and operation of Bachelor Officer and Enlisted quarters.
	752X	Food Service – are technical specialist in the field of food service and administration.
	753X	Civil Engineer - are technical specialists in the fields of construction, facilities maintenance, utilities and automotive equipment.

F. DEFINITION OF VARIABLES

1. Definition of Dependent Variable

The dichotomous dependent variable used in the analyses shows whether the community individual was selected for Limited Duty Officer or Chief Warrant Officer. The dependent variable community was represented by the value 1 for Limited Duty Officer and a value of 0 for Chief Warrant Officer. The dependent variable Limited Duty Officer was represented by the value 1 and the individuals not selected for Limited Duty Officer was represented by value 0. The dependent variable Chief Warrant Officer was represented by the value 1 and the individuals not selected to Chief Warrant Officer were represented by the value 0.

2. Description of Independent Variables

The independent variables are grouped into two categories such as: (1) background characteristics; and (2) military characteristics. The independent variables will also be used as predictor variables for this study. Table 8 lists and provides a description of the dependent and independent variables in the model.

Table 8. Description of Variables

VARIABLE	VARIABLE NAME	CODE
COMMUNITY	Comm.	1= LIMITED DUTY OFFICER PROGRAM 0= CHIEF WARRANT OFFICER PROGRAM
LIMITED DUTY OFFICER	ldo_cwo	1=LIMITED DUTY OFFICER 2=CHIEF WARRANT OFFICER
CHIEF WARRANT OFFICER	cwo_ldo	1=CHIEF WARRANT OFFICER 0=LIMITED DUTY OFFICER
BACKGROUND CHARACTERISTICS		
GENDER M or F	l_sex	M=MALE F=FEMALE
MALE	m_sex	1=MALE 0=FEMALE
FEMALE	f_sex	1=FEMALE 0=MALE
EDUCATION – education completion date on first OMT.		BS=Bachelor of Science CERT/HSDG=High School Diploma MA=Master of Arts NHSG=No High School Diploma PHD=Doctor of Philosophy POST GRAD=Some Post Graduate School
BA – BACHELOR	ed_ba	1=BACHELOR OF

OF ARTS. BA education recorded.		ARTS 0=NO BACHELOR OF ARTS
HIGHEST EDUCATION – highest education found for individuals on the OMT.	ed_highest	BS=BACHELOR OF SCIENCE CERT/HSDG=High School Diploma MA=Master of Arts NHSG=No High School Diploma PHD=Doctor of Philosophy POST GRAD=Some Post Graduate School SOME COL=Some college
RACE ETHNIC CATEGORY	reth_1	WHITE BLACK HISPANIC NATIVE OTHER/UNK
MARTIAL STATUS	married	MARRIED Y/N MARRIED= 1 NOT MARRIED= 0
FAMILY STATUS – number of children.	num_child	CHILDREN Y/N 1= CHILDREN 0= NOT MARRIED
MILITARY CHARACTERISTICS		
RANK – ETF Last Pay Grade before commissioning	last_etf_pg	6= FIRST CLASS PETTY OFFICER (E-6) 7= CHIEF PETTY OFFICER (E-7) 8= SENIOR CHIEF PETTY OFFICER (E-8) 9= MASTER CHIEF PETTY OFFICER (E-9)
LENGTH OF SERVICE – ETF time from active duty service date to Enlisted Master Record loss date/last quarter date.	etf_los	NUMBER OF YEARS

TOTAL SEA TIME – the number of years of sea time before commissioning.	total_enl_sea	NUMBER OF YEARS
SURFACE WARFARE COMMUNITY	swo_c	1= SURFACE WARFARE COMMUNITY 0= OTHER
AVIATION WARFARE COMMUNITY	avow_c	1= AVIATION WARFARE COMMUNITY 0= OTHER
SUBMARINE WARFARE COMMUNITY	sub_c	1= SUBMARINE WARFARE COMMUNITY 0= OTHER
STAFF CORPS COMMUNITY	staf_c	1= STAFF CORPS COMMUNITY 0= OTHER
AFQT –Armed Forces Qualification Test	etf_afqt	PERCENTILE

Table 8, was a list of all the variables used in the study. The following is a summary of the data manipulation performed for the thesis.

3. Gender

The gender variable was recoded with males represented by a value 1 and females were represented by a value of 0.

4. Education

Education was comprised into three categories due to the Limited Duty Officer and Chief Warrant Officer Communities do not require a college degree. The three categories are education completion date on first Officer Management Tape (OMT). This indicates if the LDO or CWO had a college degree while serving in an enlisted status prior to commissioning. The second category is Bachelor of Arts. A Bachelor of Arts degree is represented by a value of 1. No Bachelor of Arts degree is represented by a value of 0. The third category is highest education found for individuals on the Officer Management Tape (OMT). This category indicates the highest education rather before commission or after commission.

5. Race/Ethnicity

There were 5 different categories of race and ethnicity variables in the data set. This study uses one variable set of race ethnicity.

6. Length of Service

The length of service enlisted tape file is a variable that indicates the total amount of time in service prior to commissioning. The length of service variable was recoded from a string to numeric. The original data set listed the length of service time in months. The data set was transformed into years for the model.

7. Sea Time

The total sea time variable indicates the amount of enlisted sea time prior to commissioning. The original data set listed the total sea time in months. The data set was transformed into years for the model.

8. Surface Warfare

A new variable was created called Surface Warfare community (swo_c). Limited Duty Officers and Chief Warrant Officers that are in the Surface Warfare community were represented by a value of 1. The other communities were represented by a value of 0.

9. Aviation Warfare

A new variable was created called Aviation Warfare community (avow_c). Limited Duty Officers and Chief Warrant Officers that are in the Aviation Warfare community were represented by a value of 1. The other communities were represented by a value of 0.

10. Submarine Warfare

A new variable was created called Submarine Warfare community (sub_c). Limited Duty Officers and Chief Warrant Officers that are in the Surface Warfare community were represented by a value of 1. The other communities were represented by a value of 0.

11. Staff Corps

A new variable was created called Staff Corps community (staf_c). Limited Duty Officers and Chief Warrant Officers that are in the Staff Corps community were represented by a value of 1. The other communities were represented by a value of 0.

12. Description of Armed Forces Qualification Test

The Armed Forces Qualification Test (AFQT) was used to determine if there are differences in the AFQT scores between Limited Duty Officers and Chief Warrant Officers. The Armed Forces Qualification Test is used to measure the aptitude for determining eligibility for admission into the United States Armed Forces. The AFQT is a combination of scores from sections included in the Armed Services Vocational Aptitude Battery (ASVAB). The ASVAB is a test administered to all military enlisted applicants. The test identifies applicants who exceed the minimum requirements and it is used to assign which occupation an applicant is qualified. The AFQT uses four areas of the ASVAB such as: word knowledge, paragraph comprehension, arithmetic reasoning, and mathematics knowledge to compute the overall Armed Forces Qualification Test score (Hanser, Kilburn, Klerman, 1998).

G. ANALYTIC APPROACH

A descriptive statistic will be used in this study. Descriptive statistics are used to describe the basic features of the data in the study (Norusis, 2004). This study will use descriptive statistics to summarize the variability in the data set such as: the mean, mode, median.

The study will use a correlation statistic to describe the degree of relationship between the two dichotomous variables Limited Duty Officer and Chief Warrant Officers (Nie, 1975). Once the correlation has been computed, a significant test will be conducted. A t-test will be used to evaluate the differences in means between two variables.

Additionally, a binary logistic regression analysis will be used to analyze the Limited Duty Officer and Chief Warrant Officer community from 1990 to 2005. The regression analysis will compare both Limited Duty Officer and Chief Warrant Officer Communities using the background characteristics and military characteristics.

H. SUMMARY

This chapter describes the source and methods used to construct the database used in the study. This chapter describes the descriptive statistics used to determine the differences in the Limited Duty Officer and Chief Warrant Officer Community. The binary logistic regression analysis was included and is used to analyze the year groups 1990 to 2005 between the Limited Duty Officer and Chief Warrant Officer Community. Chapter IV discusses the results of the descriptive statistics, t-test, correlation analysis and the binary logistic regression analysis.

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IV. DATA ANALYSIS

A. INTRODUCTION

This chapter presents the results of analysis of data from the Limited Duty Officer and Chief Warrant Officer Programs. The analyses identify factors that differentiate between the candidates selected for the Limited Duty Officer and Chief Warrant Officer programs. The chapter includes four sections. The first section presents descriptive statistics for the entire officer sample. The second section provides descriptive statistics for data from officers in the Limited Duty Officer Community. The third section provides descriptive statistics for data from officers in the Chief Warrant Officer Community. The fourth section presents results of correlation and regression analyses performed to identify predictors for the Limited Duty Officers and Chief Warrant Officers programs.

B. DESCRIPTIVE STATISTICS FOR OFFICER SAMPLE

Descriptive statistics were computed for both background characteristics and military characteristics of both Limited Duty Officers and Chief Warrant Officers. This section contains the variable frequencies for each of the independent variables used in the study.

1. Background Characteristics of Officer Sample

Distributional properties of the background characteristics of the officer sample are presented in Table 9. A total of 9,970 cases were analyzed. Table 9 reveals a sample size of a total of 731 women (7.3%) and 9,239 men (93%). The average age of Limited Duty Officers and Chief Warrant Officers was 35.4 with a median of 35 and most frequent age of 33 years-old. The race and ethnic distribution of the sample was 76.4% White ($n = 7,621$), 15% Black ($n = 1,451$), 2.4% Hispanic ($n = 239$), 3% Asian Pacific Islander (294) and 3% other ($n = 301$). The educational characteristics for the sample included 7% Bachelors degree, 7% Associates degree, 74% High Schools Diploma, 4.2% GED, 2.4% Non-Grads and 2% unknown. The highest level of education recorded on the Officer Management Tape was 12.4% with a Bachelor of Science degree,

4.2% Master Degree, .1% PHD, .1% Post Graduate, 3% High School Diploma and 8% some college. Approximately, 88.4% of the sample were married and 11.6% were single.

Table 9. Descriptive Statistics of Background Characteristics Officer Sample (N=9970)

Variable	Number	Percentage
Gender		
Female	731	7.3%
Male	9,239	92.7%
Age		
Average age	35.45	
Race/Ethnicity		
Asian Pacific Islander	294	2.9%
Black	1,451	14.6%
Hispanic	239	2.4%
Native	64	.6%
Other/Unknown	301	3%
White	7,621	76.4%
Education		
Associates	662	6.6%
Bachelors+	677	6.8%
GED/CERTs	419	4.2%
High School Diploma	7,360	73.8%
Non-Grads	243	2.4%
Some college	3	.0%
Unknown	181	1.8%

2. Military Characteristics for Officer Sample

Distributional properties of the military characteristics of the officer sample were presented in Table 10. Before commissioning, approximately, 2.3 % of Limited Duty Officers and Chief Warrant Officers were Master Chief Petty Officers (E-9), 16.4% Senior Chief Petty Officers (E-8), 67.9% Chief Petty Officer (E-7), 8.7% First Class Petty Officer (E-6) and .6% Second Class Petty Officer (E-5). The average length of time in service for the sample was 15 years. The warfare community totals were 3,776 Surface, 661 Submarine, 1908 Aviation, 2886 General and 739 Staff Corps. The average sea time was 6.7 years. About 65% was the average score on the Armed Forces Qualification Test.

Table 10. Descriptive Statistics of Military Characteristics Officer Sample (N=9970)

Variable	Number	Percentage
Rank		
Master Chief Petty Officer (E-9)	229	2.3%
Senior Chief Petty Officer (E-8)	1,637	16.4%
Chief Petty Officer (E-7)	6,773	67.9%
First Class Petty Officer E-6	864	8.7%
Second Class Petty Officer E-5	56	.6%
Time in Service		
Average length of time	15 years	
Warfare		
Community		
Surface Warfare	3,776	
Submarine Warfare	661	
Aviation Warfare	1,908	
General	2,886	
Staff Corps	739	
Sea time		
Average length of sea time	6.7	
Armed Forces Qualification Test (AFQT)		
Average score		64.9%

3. Correlation Analysis

This study uses a Pearson Correlation Coefficients to examine the relationship of the variables in the study. Table 11 and 12 displays the correlation coefficients of the variables in the study. There were significant correlations between Limited Duty Officers, Chief Warrant Officers and number of children, Armed Forces Qualification Test (AFQT), Asian Pacific Islander, Black, Hispanic and other. The bivariate relationship between Limited Duty Officer, Chief Warrant Officer Communities and married or gender was not significant.

Table 11. Correlations Group 1

Variable	1	2	3	4
1. Limited Duty Officer				
2. Chief Warrant Officer	1.0			
3. Married Flag	-		.009**	
	.009**		.009**	
4. Number of Children	.072**	.072**	.284**	

** Correlation is significant at the 0.01 level (2-tailed).

Table 12. Correlations Group

Variable	1	2	3	4	5	6
1. AFQT percentile						
		.069(**)	.362(**)	.060(**)		.063(**)
2. Pacific Islander	-		-	-		-
	.069(**)		.072(**)	.027(**)		.031(**)
3. Black	-	-			-	-
	.362(**)	.072(**)		.065(**)	.033(**)	.073(**)
4. Hispanic	-	-	-			-
	.060(**)	.027(**)	.065(**)			.028(**)
5. Native				-		
			.033(**)			
6. Other	-	-	-	-		
	.063(**)	.031(**)	.073(**)	.028(**)		

** Correlation is significant at the 0.01 level (2-tailed).

C. DESCRIPTIVE STATISTICS FOR LIMITED DUTY OFFICER SAMPLE

The background characteristics of the Limited Duty Officer sample were presented in Table 13. A total of 5,772 cases were analyzed. Table 13 has a sample size total of 402 women (7%) and 5,371 men (93%). Limited Duty Officers had an average age of 34.5 years-old. The race and ethnic category had a sample total of 163 (3%) Asian Pacific Islander, 808 (14%) Black, 145 (3%) Hispanic, 37 (1%) Native, 143 (3%) other unknown and 4477 (77.6) White. Education was broken down into two areas: education on the enlisted transfer file which indicates the education that a Limited Duty Officer and Chief Warrant Officer obtained prior to commissioning. The variable highest education indicates the highest education on record for both Limited (74), Non-Grads 243 (2.4), Duty Officers and Chief Warrant Officers. The education totals for the enlisted transfer

file were 8s and bs 44 (.4%), Associates 662 (7%), Bachelors+ 677 (7%), GED 419 (4.2), high school diploma 7360 (74%) and unknown181 (2%). Highest education completed for Limited Duty Officers were Bachelor of Science 775 (13.4%), high school diploma 138 (2.4%), Master of Arts 290 (5%), no high school 1, Doctor of Phsichology 10 (.2%), post graduate 3 (.1) and some college 411 (7.1%). Approximately, 88% of Limited Duty Officers were married.

Table 13. Descriptive Statistics of Background Characteristics Limited Duty Officer Sample
(N=5,772)

Variable	Number	Percentage
Gender		
Female	402	7%
Male	5,371	93%
Age		
Average age	34.5 years	
Race/Ethnicity		
Asian Pacific Islander	163	2.8%
Black	808	14%
Hispanic	145	2.5%
Native	37	.6%
Other/Unknown	143	2.5%
White	4,477	77.6%
Education		
Enlisted Transfer File		
8's/Bs	25	.4%
Associates	386	6.7%
Bachelors+	424	7.3%
GED/CERTs	200	3.5%
High School Diploma	4,323	74.9%
Non-Grads	110	1.9%
Some college	3	.1%
Unknown	129	2.2%
Highest Education Recorded on Officer Management Tape		
Bachelor of Science Diploma	775	13.4%
High School Diploma	138	2.4%
Master of Arts Philosophy	290	5%
Doctor of Philosophy	10	.2%
Post Graduate	3	.1%
Some college	411	7.1%

The descriptive statistics for Limited Duty Officer military characteristics were presented in Table 14. Prior to commissioning, about 61 (1.1%) were Master Chief Petty Officers (E-9), 599 (10.4%) Senior Chief Petty Officers (E-8), 4074 (70.6%) Chief Petty Officer (E-7), 822 (14.2%) First Class Petty Officers (E-6). The average time in service before commissioning was 13.7 years. The Warfare community totals were 2,039 Surface Warfare, 400 Submarine Warfare, 1076 Aviation Warfare, 1918 General Officer, 340 Staff Corps. Limited Duty Officers spent an average of 6.5 years at sea before commissioning. The average score on the Armed Forces Qualification Test were 67%.

Table 14. Descriptive Statistics of Military Characteristics Limited Duty Officer Sample (N=5,772)

Variable	Number	Percentage
Rank		
Master Chief Petty Officer (E-9)	61	1.1%
Senior Chief Petty Officer (E-8)	599	10.4%
Chief Petty Officer (E-7)	4,074	70.6%
First Class Petty Officer (E-6)	822	14.2%
Second Class Petty Officer (E-5)	29	.5%
Time in Service		
Average length of time	13.7 years	
Warfare Community		
Surface Warfare	2,039	
Submarine Warfare	400	
Aviation Warfare	1,076	
General	1,918	
Staff Corps	340	
Sea time		
Average length of sea time	6.5 years	
Armed Forces Qualification Test (AFQT)		
Average score		67%

D. DESCRIPTIVE STATISTICS FOR CHIEF WARRANT OFFICER SAMPLE

The background characteristics of the Chief Warrant Officer sample were presented in Table 15. A total of 4,197 cases were analyzed. Table 15 shows a sample size of a total of 329 (8%) women and 3868 (92.2%) men. The average age of Chief Warrant Officers at accession date were 37 years old. The race and ethnic category of the sample was a of 131 (3.1%) Asian Pacific Islander, 643 (15.3%) Black, 94 (2.2%) Hispanic, 27 (1%) Native, 158 (4%) other unknown, 3144 (75%) White. Education recorded on the Enlisted Transfer File prior to commissioning were 276 (7%) Associates Degree, 253 (6%) Bachelors Degree, 219 (5.2%) GED, 3037 (72.4%) High School Diploma, 133 (3.2%) Non-Graduates and 52 (1.2%) unknown. The highest education recorded on the Officer Management Tape were 459 (11%) Bachelor Science, 144 (3.45) High School Diploma, 127 (3%) Master of Arts, 2 Doctor of Philosophy, 6 (.1%) Post Graduate, 1 Post Masters of Arts, 358 (9%) some college. Approximately, 58% of Chief Warrant Officers were married.

Table 15. Descriptive Statistics of Background Characteristics Chief Warrant Officer Sample (N=4,197)

Variable	Number	Percentage
Gender		
Female	329	7.8%
Male	3868	92%
Age		
Average age	36.7 years	
Race/Ethnicity		
Asian Pacific	131	3.1%
Islander		
Black	643	15.3%
Hispanic	94	2.2%
Native	27	.6%
Other/Unknown	158	3.8%
White	3144	74.9%
Education		
Enlisted Transfer		
File		
8's/Bs	19	.5%
Associates	276	6.6%
Bachelors+	253	6%
GED/CERTs	219	5.2%
High School	3037	72.4%
Diploma		
Non-Grads	133	3.2%
Unknown	52	1.2%
Highest Education Recorded on Officer Management Tape		
Bachelor of Science	459	10.9%
High School	144	3.4%
Diploma		
Master of Arts	127	3%
Doctor of Philosophy	2	.0%
Philosophy		
Post Graduate	6	.1%
Post Masters of Arts	2	.0%
Some college	358	8.5%

The descriptive statistics for Chief Warrant Officer military characteristics were presented in Table 16. Before commissioning, approximately, 168 (4%) were Master Chief Petty Officers (E-9), 1038 (25%) Senior Chief Petty Officers (E-8), 2699 (64.3) Chief Petty Officers (E-7), 42 (1%) First Class Petty Officers (E-6). The average length of service were 17 years. The amount of sea time that Chief Warrant Officers acquired before commissioning was 7 years. The average score on the Armed Forces Qualification Test for Chief Warrant Officers were 62%.

Table 16. Descriptive Statistics of Military Characteristics Chief Warrant Officer Sample (N=4,197)

Variable	Number	Percentage
Rank		
E-9 Master Chief Petty Officer	168	4%
E-8 Senior Chief Petty Officer	1,038	24.7%
E-7 Chief Petty Officer	2,699	64.3%
E-6 First Class Petty Officer	42	1%
E-5 Second Class Petty Officer	27	.6%
Time in Service		
Average length of time		16.7%
Warfare		
Community		
Surface Warfare	1,737	
Submarine Warfare	261	
Aviation Warfare	832	
General	968	
Staff Corps	399	
Sea time		
Average length of sea time	6.9 years	
Armed Forces Qualification Test (AFQT)		
Average score		61.8%

E. REGRESSION ANALYSES

A binary logistic regression analyses were performed to test the proposed hypotheses. The model was used to determine if there is a significant relationship between the dependent variable and each of the independent variables. The hypothesis is background and military characteristics would be a predictor of community between Limited Duty Officers and Chief Warrant Officers. The analysis uses a binary logistic regression that comprises of both background and military characteristics. The background characteristics entered are: age, gender, ethnicity and education. The military characteristics entered are; rank, length of service and Armed Forces Qualification Test.

1. Binary Logistic Regression Analysis for Predictors of Limited Duty Officer Community

A binary logistic regression analysis were performed to determine the impact of demographic and military characteristics on the Limited Duty Officer Community. Table 17 below displays the results of the binary logistic regression analysis of background and military characteristics on community for Limited Duty Officer Officers of the sample. Table 17 shows regression coefficients (B), with the corresponding standard error (SE), Wald statistics, degrees of freedom (df), significance (Sig) and Exp (B). The results indicate that some of the background and military characteristics were significant in predicting Limited Duty Officer Community. The following independent variables were statistically significant: Age (B = .033; p = .008; Odd Ratio = 1.033), Black (B = .332; p = .001; Odd Ratio = 1.394), Other (B = -.535; p = .014; Odd Ratio = .586), GED (B = -.249; p = .081; Odd Ratio = .780), Rank (B = .139; p = .045; Odd Ratio = 1.150), Length of Service (B = -.513; p = .000; Odd Ratio = .599), AFQT (B = .007; p = 000; Odd Ratio = 1.007).

Table 17. Binary Logistics Regression for Limited Duty Officer

Variable	B	S.E.	Wald	Exp(B)
Age	.033	.012	7.073	1.033
Male	.045	.131	.116	1.046
Married	-.066	.104	.403	.936
Asian	-.150	.201	.557	.861
Pacific Islander				
Black	.332	.098	11.434	1.394
Hispanic	.319	.202	2.486	1.376
Native	.171	.381	.202	1.187
Other	-.535	.217	6.058	.586
Associates	.063	.132	.227	1.065
Bachelors	.227	.140	2.610	1.254
GED	-.249	.143	3.046	.780
Othered	-.129	.508	.064	.879
Rank	.139	.069	4.036	1.150
Length of service	-.513	.021	616.078	.599
AFQT	.007	.002	14.451	1.007
Constant	5.426	.533	103.452	227.242

a Variable(s) entered on step 1: Age, Male, Married, Asian Pacific Islander, Black, Hispanic, Native, Other, Associates, Bachelors, GED, Othered, Rank, Length of service, AFQT.

2. Binary Logistic Regression Analysis for Predictors of Chief Warrant Officer Community.

A binary logistic regression analysis were performed to determine the impact of demographic and military characteristics on the Chief Warrant Officer Community. Table 18 below displays the results of the binary logistic regression analysis of background and military characteristics on community for Chief Warrant Officers of the sample. Table 18 shows regression coefficients (B), with the corresponding standard error (SE), Wald statistics, degrees of freedom (df), significance (Sig) and Exp (B). The results indicate that some of the background and military characteristics were significant in predicting Limited Duty Officer and Chief Warrant Officer Community. The following independent variables were statistically significant: Age (B = -.033; p = .008; Odd Ratio = .968), Black (B = -.332; p = .001; Odd Ratio = .717), Other (B = .535; p = .014; Odd Ratio = 1.707), GED (B = .249; p = .081; Odd Ratio = 1.283), Rank (B = -

.139; p = .045; Odd Ratio = .870), Length of Service (B = .513; p = .000; Odd Ratio = 1.670), AFQT (B = -.007; p = 000; Odd Ratio = .993).

Table 18. Binary Logic Regression for Chief Warrant Officers Variables in the Equation

Variable	B	S.E.	Wald	Exp(B)
Age	-.033	.012	7.073	.968
Male	-.045	.131	.116	.956
Married	.066	.104	.403	1.068
Asian	.150	.201	.557	1.162
Pacific Islander				
Black	-.332	.098	11.434	.717
Hispanic	-.319	.202	2.486	.727
Native	-.171	.381	.202	.843
Other	.535	.217	6.058	1.707
Associates	-.063	.132	.227	.939
Bachelors	-.227	.140	2.610	.797
GED	.249	.143	3.046	1.283
Othered	.129	.508	.064	1.137
Rank	-.139	.069	4.036	.870
Length of service	.513	.021	616.078	1.670
AFQT	-.007	.002	14.451	.993
Constant	5.426	.533	103.452	.004

a Variable(s) entered on step 1: Age, Male, Married, Asian Pacific Islander, Black, Hispanic, Native, Other, Associates, Bachelors, GED, Othered, Rank, Length of service, AFQT.

F. SUMMARY

This chapter provided the results of the analysis of the Limited Duty Officer (LDO) and Chief Warrant Officer (CWO) Communities. The results of descriptive statistics, correlations and binary logistic regression were presented to identify predictors of community. The binary logistic regression was used to examine the differences in background and military characteristics of Limited Duty Officers and Chief Warrant Officers. Results reveal that age was a significant predictor of community. In the race and ethnic category, Black and other category of people was a significant predictor of community. The education category revealed that the GED was significant background characteristic. Additionally, rank, length of service and Armed Forces Qualification Test

were predictors of LDO or CWO community. The details of the findings will be discussed in the next chapter.

V. CONCLUSIONS AND RECOMMENDATIONS

A. INTRODUCTION

This study examined differences in background and military characteristics of Naval Officers from the Limited Duty Officer (LDO) and Chief Warrant Officer (CWO) programs. Findings of this study suggest that there are significant differences in the background and military characteristics of officers in these programs. This chapter summarizes the study's main findings and provides recommendations for future research.

B. SUMMARY AND CONCLUSIONS

The summary of main findings for the study is presented in Table 19. Results of logistic regression analyses reveal differences in background and military characteristics of Limited Duty Officers and Chief Warrant Officers. Among the background characteristics examined in this study, age, race, ethnicity and education emerged as significant predictors of membership in these programs. Among, the military characteristics examined in this study, rank, length of service and the Armed Forces Qualification Test emerged as significant predictors of the memberships in these programs.

Table 19. Binary Logistic Regression of Background and Military Characteristics for Limited Duty Officers and Chief Warrant Officers

Variable	B	S.E.	Wald	Exp(B)
Age	.033	.012	7.073	1.033
Male	.045	.131	.116	1.046
Married	-.066	.104	.403	.936
Asian	-.150	.201	.557	.861
Pacific Islander				
Black	.332	.098	11.434	1.394
Hispanic	.319	.202	2.486	1.376
Native	.171	.381	.202	1.187
Other	-.535	.217	6.058	.586
Associates	.063	.132	.227	1.065
Bachelors	.227	.140	2.610	1.254
GED	-.249	.143	3.046	.780

Othered Rank	-.129 .139	.508 .069	.064 4.036	.879 1.150
Length of service	-.513	.021	616.078	.599
AFQT	.007	.002	14.451	1.007
Constant	5.426	.533	103.452	227.242

Interestingly, the background characteristic age variable was significant. Results of logistic regression analysis showed that there is a high probability that older sailors will most likely get selected for the Limited Duty Officer Community. This is interesting because the minimum time of service for eligibility for Limited Duty Officers is eight years and the maximum time of eligibility is 16 years. The Chief Warrant Officers program has a minimum time of service eligibility of 14 years and a maximum time of 24 years. On the other hand, age was negatively correlated with membership in the Chief Warrant Officer program. Given all requirements are met, the younger the eligible candidate the more likely they will be selected for the Chief Warrant Officer program. Chief Warrant Officers can apply for the Limited Duty Officer program provided they have completed the necessary requirements. According to Fernandez, one of every eight Limited duty Officers selected come from the Chief Warrant Officer Community (2002). This could impact the age of candidates selected for the Limited Duty Officers. This could present challenges for the Limited Duty Officer Community. There are approximately 16 Limited Duty Officer Captain 0-6 billets. The Limited Duty Officers may have to select younger candidates in order to fill the Captain billets. The age for Chief Warrant Officers will not make an impact on their billets.

Results of logistic regression analysis also revealed that a black candidate has a higher probability of being selected for the Limited Duty Officer program than any other ethnic minority group. Blacks have been above average in enlisted retention. The Limited Duty Officer and Chief Warrant Officer Program is a late career commission program. This may be related to the increase coefficient of Blacks being higher than other ethnic categories. The significant coefficient of Black Limited Duty Officer raises questions. What are the practical implications for long term retention and promotion of Black officers into senior billets (06-Flag)? Does this inadvertently have a negative

impact on retention and promotion of Black officers into the higher ranks? The Limited Duty Officer program could have an effect on the enlisted retention of Black sailors.

Another interesting background characteristic was the Graduate Education Diploma (GED). The GED was part of the Education category. The GED was significant for the Chief Warrant Officers. The regression shows that Chief Warrant Officers are more likely to have a GED than Limited Duty Officers. This is interesting because many times the Military Entrance Processing Station (MEPS) will not allow non-high school graduates entry into the military service. When quotas are low, there are a selected number of GED that are allowed into the service provided they have met other requirements. Personnel with GEDs have to score higher on the Armed Services Vocational Aptitude Battery Test (ASVAB). Typically, personnel with a GED have to score higher on the ASVAB than high school graduates. The Navy has been pushing the educational requirements for the enlisted sailors. Perhaps the Navy should institute a policy to make Chief Warrant Officers and Limited Duty Officers have a Bachelors Degree requirement for commissioning. If the Navy is leaning towards a college degree requirement for senior enlisted, the same standard should be required for all officers.

Rank was a significant military characteristic for Limited Duty Officers. Both Limited Duty Officers and Chief Warrant Officers are considered late career selection for senior enlisted (E-6 through E-9). Chief Petty Officers (E-7) in particular have the highest probability of being selected for both Limited Duty Officer and Chief Warrant Officer. The Limited Duty Officer and Chief Warrant Officer communities come primarily from the Chief Petty Officer Community. Chief Petty Officers are typically and relatively older than other Navy personnel. The Limited Duty Officer (LDO) Community selects approximately five percent from the First Class Petty Officer (E-6) ranks. The Navy should consider selecting a higher percentage of the First Class Petty Officer ranks in order to increase the senior LDO ranks in the future.

The regression results show that Length of Service prior to commissioning positively affects candidates that are selected for Chief Warrant Officer (CWO). The length of service was a negative influence for Limited Duty Officers (LDO). This was expected because of the minimum and maximum time requirements entry into both LDO

and CWO programs. Most interesting about this finding is that length of service was positively significant for Chief Warrant Officers, but age was negatively significant. As stated earlier, the age requirement for Chief Warrant Officers is not as critical as Limited Duty Officers.

Finally, the results of the regression indicate that the Armed Forces Qualification Test (AFQT) was significant. The AFQT is a test given all personnel applying for entry into the enlisted services. The results show that Limited Duty Officers have a higher probability of scoring higher on the Armed Forces Qualification Test than Chief Warrant Officers. The AFQT score indicates that the educational quality of LDO candidates is higher, in general, than Chief Warrant Officers. Enlisted personnel are allowed to retake the ASVAB test. This information could be promulgated to enlisted sailors who may be considering applying for the LDO program.

C. RECOMMENDATIONS FOR FURTHER RESEARCH

Recent studies have evaluated the Chief Warrant Officer Community to see if it is beneficial to expand the community. There were no prior research studies found on the Limited Duty Officer Community. Further research could investigate a trend analysis of both programs to understand and clarify how both programs have evolved through the years.

Both Limited Duty Officer and Chief Warrant Officer Communities can have an effect on enlisted retention. Further examination might reveal specifically how and when both communities have the greatest positive impact on enlisted retention. Specifically, the LDO and CWO programs may attract those enlisted personnel that are looking for more challenging educational opportunities and/or leadership positions. Additionally, the other officer programs such as: U.S. Naval Academy, Seaman to Admiral and Officer Candidate School have limiting age requirements, whereas Limited Duty Officer and Chief Warrant Officer apply later in career selection and development. Many enlisted sailors may remain in enlisted service past first or second enlistment to apply for the Limited Duty Officer and Chief Warrant Officer Programs. As the data in this study

shows, Limited Duty Officer and Chief Warrant Officer candidates have an average of 13 to 15 years of service prior to being selected.

This study revealed that Blacks have a higher probability of being selected for Limited Duty Officer program than any other ethnic group. Further study may investigate if Black enlisted personnel retention is higher than other minority groups. In regards to GED and Armed Forces Qualification Test scores this may have a correlation.

In July 2004, a quick poll survey was sent out to the fleet by the Chief of Naval Personnel. The quick poll survey was taken by Navy enlisted service members in pay grades E-1 through E-9. Further examination could explore the results of the survey and conduct a qualitative analysis of the findings. What might be gained from this type of study is how enlisted sailors perceive the Limited Duty Officer and Chief Warrant Officer programs. Also, this type of study could reveal how much enlisted personnel know about the programs, which one of the two they prefer, and why. A qualitative approach with focus groups and interviews could get some direct feedback on the impact of both LDO and CWO programs on the enlisted structure. Additionally, senior enlisted Master Chief Petty Officers (E-9) may have different perceptions toward these programs.

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